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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,586	01/21/2004	Fuminori Hayano	117681	1115

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EXAMINER	
AKANBI, ISIAKA O	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/760,586	HAYANO, FUMINORI	
	Examiner	Art Unit	
	Isiaka O. Akanbi	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The examiner approves the drawings filed 21 January 2004.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 is/are rejected under 35 U.S.C. 102(e) as being anticipated by Morohoshi et al. (6,563,573 B1).

As regard to claims 1 and 16, Morohoshi discloses an apparatus for analyzing overlay deviation in alignment between a first mark and a second mark that are formed on a substrate comprising of the following:

calculates a relationship between changes in overlay deviation values and changes in focus position of the substrate for a plurality of sets of the first and second marks that are provided on the substrate and provides an output from which a user can determine whether the substrate suffers from wafer-induced-shift (fig. 1)(fig. 2)(col. 1, line 33-col. 4, line 46) (col. 5, line 35-col. 7, line 25).

As to claims 2, 17 and 29, according to claim 1 and 16, Morohoshi discloses wherein the controller (15) determines a vector-map illustrating the calculated relationship for the plurality of different sets of first and second marks on the substrate and the apparatus further comprises a display electrically coupled to the controller to display the vector-map (fig. 1)(fig. 2)(col. 6, line 45-51).

As to claims 3, 12, 18 and 27, Morohoshi discloses wherein the controller also determines a relationship between changes in tool-induced-shih error values and changes in focus position of the substrate for the plurality of sets of the first and second marks that are provided on the substrate (col. 5, line 59-col. 6, line 55).

As to claims 4, 13, 19 and 28, Morohoshi discloses comparing the determined relationship between changes in overlay deviation values and changes in focus position with the determined relationship between changes in tool-induced-shift error values and changes in focus position (fig. 1)(col. 1, line 39-col. 2, line 65).

As to claims 5, 14, 20 and 30, Morohoshi discloses wherein the controller (15) determines a first vector-map illustrating the calculated relationship between changes in tool-induced-shift error values and changes in focus position for the plurality of different sets of first and second marks on the substrate, determines a second vector-map illustrating the calculated relationship between changes in overlay deviation values and changes in focus position of the substrate for the plurality of different sets of first and second marks on the substrate; and wherein the apparatus further comprising a display electrically coupled to the controller to display the first and second vector-maps (fig. 2)(col. 5, line 59-col. 6, line 67).

As to claims 6 and 31, Morohoshi discloses wherein the controller calculates the relationship between changes in overlay deviation values and changes in focus position of the substrate for each of the plurality of sets of the first and second marks by determining an overlay deviation value for each of the sets of marks at two different focus positions of the substrate (col. 6, line 56-67).

As to claims 7 and 22, Morohoshi discloses wherein the controller determines each of the overlay deviation values by determining a positional deviation value in alignment between the first mark and the second mark by processing an image signal obtained from a captured image of the first and second marks, determining a tool-induced-shift error value from the obtained image signal and determining an overlay deviation value based on the positional deviation value and the tool-induced-shift error value (fig. 2)(fig. 3)(col. 6, line 56-col. 7, line 32).

Regarding claims 8 and 23, Morohoshi discloses an optical overlay deviation measurement apparatus for optically measuring overlay deviation in alignment between a first mark and a second mark that are formed on a substrate comprising of the following:

a substrate holder that holds the substrate having the first mark and the second mark, the substrate holder being movable at least in an optical axis direction that is substantially

perpendicular to a surface of the substrate (col. 6, line 51-55), an illumination optical system (8) that illuminates the first and second marks of the substrate held by the substrate holder with an illumination beam, an image-forming optical system (9-13) that forms an image of the first and second marks from reflected beams reflected from the first and second marks, an imaging device (14) that captures the image of the first and second marks formed by the image-forming optical system and a controller (15) that determines a first positional deviation value in alignment between the first mark and the second mark by processing an image signal obtained by the imaging device at a first focus position of the substrate in the optical axis direction, determines a first tool-induced-shift error value from the image signal obtained at the first focus position of the substrate in the optical axis direction, determines a first overlay deviation value based on the first positional deviation value and the first tool-induced-shih error value, determines a second positional deviation value in alignment between the first mark and the second mark by processing an image signal obtained by the imaging device at a second focus position of the substrate in the optical axis direction, the second focus position being different from the first focus position in the optical axis direction, determines a second tool-induced-shift error value from the image signal obtained at the second focus position of the substrate, determines a second overlay deviation value based on the second positional deviation value and the second tool-induced-shift error value, calculates a relationship between changes in overlay deviation values and changes in focus position based upon the determined first and second overlay deviation values and the first and second focus positions, and provides an output from which a user can determine whether the substrate suffers from wafer-induced-shift (fig. 2)(col. 5, line 35-col. 7, line 32).

As to claims 9 and 24, Morohoshi discloses wherein the controller (15) determines a vector-map illustrating the calculated relationship for different coordinate values on the substrate, and the display displays the vector-map (fig.1)(fig. 2)(col. 6, line 49-51).

As to claims 10 and 25, Morohoshi discloses a rotation system that rotates the substrate holder about the optical axis direction, and wherein each of the first and second positional deviation values are determined from measurements taken at two different rotational orientations of the substrate (col. 2, line 22-35).

As to claims 11 and 26, Morohoshi discloses wherein the two different rotational orientations differ from each other by 180^0 (fig. 1).

As to claim 15, Morohoshi discloses wherein the apparatus calculates the relationship between changes in overlay deviation values and changes in focus position for a plurality of sets of first and second marks disposed on the substrate (fig. 3)(col. 7, line 1-32).

As to claim 21, Morohoshi discloses wherein the relationship between changes in overlay deviation values and changes in focus position of the substrate is calculated for each of the plurality of sets of the first and second marks by determining an overlay deviation value for each of the sets of marks at two different focus positions of the substrate (fig. 2)(col. 5, line 35-col. 6, line 23).

As to claim 32, Morohoshi discloses a method of analyzing optical overlay deviation in alignment between a first mark and a second mark that are formed on substrates, the method comprising the steps of calculating a first relationship between changes in overlay deviation values and changes in focus position of a first substrate for a plurality of sets of the first and second marks that are provided on the first substrate, calculating a second relationship between changes in overlay deviation values and changes in focus position of a second substrate for a plurality of sets of the first and second marks that are provided on the second substrate and determining a shift in wafer-induced-shih by comparing the first relationship with the second relationship (fig. 1)(col. 1, line 39-col. 2, line 65).

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references listed in the attached form PTO-892 teach of other prior art method/apparatus for analyzing overlay deviation in alignment that may anticipate or obviate the claims of the applicant's invention.

Conclusion

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isiaka Akanbi whose telephone number is (571) 272-8658. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Isiaka Akanbi
January 30, 2006

LAYLA G. LAUCHMAN
PRIMARY EXAMINER